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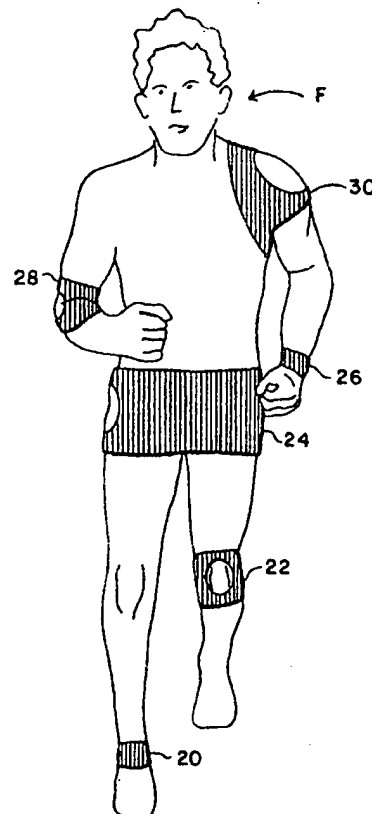


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(54) Title: MAGNETIC WRAP FOR JOINTS**(57) Abstract**

Flexible and elastic magnetic joint wraps (30, 28, 26, 24, 22, 20) incorporate superstrong magnets with alternating polarities to provide enhanced magnetotherapeutic effects. Magnetotherapeutic joint wraps that are flexible and elastic incorporate superstrong magnets such as those based on iron (magnetic ferrite) or neodymium (particular neodymium-iron-boron (NdFeB)) in order to provide superstrong static magnetism by which magnetotherapy may be effected. Elements that are generally oppositely opposed serve to detachably attach portions of the magnetic wrap to one another so that the magnetic joint wrap may conform to the local shape and form of the area adjacent the joint. Additionally, eye (120) and face masks (150) may incorporate the superstrong magnets as used in the magnetic joint wrap of the present invention of good advantage.



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MAGNETIC WRAP FOR JOINTS

TECHNICAL FIELD

This invention relates to magnetotherapeutic devices, and more particularly to muscle and/or joint wraps incorporating static magnetic field generators in the form of magnets to provide magnetotherapy to adjacent tissues.

BACKGROUND ART

Magnetotherapy uses magnetic fields to provide therapeutic and restorative treatment to limbs, organs, and other parts of the body. Generally, one means by which magnetotherapy may be achieved is by bringing a magnet or a series of magnets into close proximity with the affected body part or organ of interest. As is known according to Faraday's Law of Magnetic Induction, as well as the Hall Effect, charged particles experience a force acting on them when they move through a magnetic field in a perpendicular direction. Since human blood is replete with ions and electrolytes, it has many charged molecules, particles, and the like which experience a force, including an aligning force, when moving through a magnetic field. When exposed and caused to so travel through a magnetic field, such ions and electrolytes may generate heat, causing the associated blood vessel to widen. The widening of the blood vessel would then allow increased volumes of blood to flow through the blood vessel.

Polar molecules (such as water) also respond to magnetic fields in a manner similar to that for charged molecules. Additional therapeutic or restorative effects might arise through the alignment of polar molecules as they pass through the magnetic field. When subject to a magnetic field, polar molecules rotate to align themselves with the field. Such alignment would alternate with the magnetic polarity as the polar molecules traveled through different regions of such magnetic polarity. The mechanical motion of the rotation of such polar molecules might also cause heating and the like and would also stimulate, mix, or agitate the blood in a gentle

manner, causing it to gently churn. Such mixing of the blood at the molecular level may cause it to more easily recognize foreign matter. By recognizing foreign matter, the blood and/or immune system may be able to more readily address such foreign matter.

5 Several patents are known having various designs for the alternation of magnets of different polarity to provide spatially diverse magnetic fields. The patent to Latzke (U.S. Patent No. 4,489,711 issued December 25, 1984) and the patents to Ardizzone (U.S. Patent No. 5,277,692 issued January 11, 1994; U.S. Patent No. 5,514,072 issued May 7, 1996; and U.S. Patent No. 5,538,495 issued July 23, 1996)
10 all disclose a variety of magnetic plaster and magnetic pads having certain magnetic geometries in order to achieve spatially varying magnetic fields through the use of magnets.

 In the past, the only way to offer or provide both mechanical support and magnetic therapy was to insert magnets between a brace and the associated body joint.
15 Recently, stronger static magnetic materials have become more readily available in the commercial market. Particularly, permanent magnets incorporating the element neodymium (atomic number 60) provide strong magnetic fields at common temperatures (below 120°F/50°C). Such magnets can be incorporated into flexible fabrics or the like to provide a flexible material suitable for wrapping around joints.
20 By using flexible and/or elastic materials such as NEOPRENE®, a magnetotherapeutic joint wrap previously unseen in the art could be realized.

 While certain portions of the human body have been emphasized as being subject to the use of magnetotherapeutic devices, it remains to be seen in the art to provide such magnetotherapy in the form of a wrap or the like for joints.
25 Additionally, strong, magnetic material used in such joint wraps could be used in an eye or face mask incorporating such magnetotherapeutic elements. It can be seen, therefore, that it would be of some advantage to provide magnetotherapeutic aid to a person's joints, eyes, and/or face, particularly while the person rests or sleeps as such magnetotherapeutic treatment could then be effected for a period of several hours
30 without interfering with a person's daily and ongoing activities.

DISCLOSURE OF INVENTION

The present invention provides a wrap by which magnetotherapy may be applied to joints and adjacent tissues. A sheet of magnetic material, preferably of a highly magnetic material, is both flexible and elastic. Preferably, this highly
5 magnetic flexible sheet has alternating polarity along its course so that travel in any direction becomes subject to alternating polarity. Strong magnets in the shapes of triangles, squares, and/or series of concentric circles may be used to provide such alternating polarity.

In the preferred embodiment, the strong source of magnetism incorporated into
10 the magnetic wrap for joints of the present invention may arise from the use of neodymium-based magnets which may be incorporated into NEOPRENE® or the like. By providing a flexibly elastic highly magnetic sheet of material having alternating magnetic polarities, a joint about which such a magnetic sheet is wrapped becomes subject to significant magnetotherapy. Magnetic ferrite may also be used in the place
15 of the neodymium-based magnets.

In order to better accommodate the joint, an aperture may be cut or fashioned in the sheet of magnetic material so as to accommodate the joint. Such an aperture may accommodate a joint such as a knee, elbow, shoulder, or the like.

Additionally, in order to hold the magnetic wrap for joints of the present
20 invention in place, attachments or attachment elements holding the magnetic sheet in place may be strategically positioned upon the sheet and may take the form such as VELCRO® hook and fasteners, or the like. Buttons, snaps, and other fasteners may also be used to good advantage.

Additionally, beyond the use of strong, neodymium-based magnetics in
25 alternating polarity configurations for use in joint wraps, face masks and eye masks may also incorporate such strong magnets so as to provide greater magnetotherapeutic effect for adjacent tissues. Such face masks have been disclosed in part in prior U.S. Patent Application Serial No. 08/911,950 filed August 15, 1997 which is incorporated herein by this reference thereto.

BRIEF DESCRIPTION OF DRAWINGS

Figure 1 shows a human figure bearing several embodiments of the magnetic wrap for joints of the present invention including an ankle wrap, a knee wrap, a hip wrap, a wrist wrap, an elbow wrap, and a shoulder wrap.

5 Figure 2 shows an embodiment of a hip, wrist or ankle wrap constructed according to the present invention.

Figure 3 shows a perspective view of a left shoulder wrap or ankle wrap.

Figure 4 shows a side perspective view of an elbow or knee wrap.

Figure 5 shows a side perspective view of a wrist or hip wrap.

10 Fig. 6 shows a front perspective view of the eye mask of the present invention. A magnetic field indicator is shown adjacent the eye mask, indicating a first embodiment of a magnetic configuration.

Fig. 7 shows a rear perspective view of the eye mask of Fig. 6.

15 Fig. 8 shows a front perspective view of the face mask of the present invention with two magnetic indicators showing two alternative embodiments of the magnetic configuration used in the present invention.

Figs. 9 and 10 show a checkerboard-type magnet configuration for use in the present invention.

20 Figs. 11 and 12 show a triangular checkerboard magnet configuration for use in the present invention.

Fig. 13 shows a circular and toroidal magnet configuration for use in the present invention.

MODE(S) FOR CARRYING OUT THE INVENTION

25 The present invention is directed mainly towards a magnetic wrap for joints by which magnetotherapy may be applied to joints and the adjacent tissue without unduly interfering with the operation of the associated joint. Additionally, strong and alternating static magnets may be used not only in such magnetic wraps for joints, but only eye masks and face masks.

30 As shown in Figure 1, a Figure F is shown wearing several of the different embodiments of the present invention. The magnetic joint wraps (Figure 2) of the

present invention may take several forms in order to accommodate several different types of joints. As shown in Figure 1, the Figure F is bearing an ankle wrap 20, a knee wrap 22, a hip wrap 24, a wrist wrap 26, an elbow wrap 28, and a shoulder wrap 30. Neck wraps or the like might be similar to a hip wrap 24 or the like in order to provide a magnetotherapeutic collar or the like.

As shown in Figure 1, the magnetic joint wraps often incorporate apertures or the like in order to accommodate the joint associated with the adjacent tissue.

In Figure 2, a hip or wrist wrap configuration is shown indicating such an aperture 40. The aperture 40 is strategically located so that upon wrapping the magnetic joint wrap (generally indicated by reference number 42), the associated joint may protrude through or otherwise be accommodated by the aperture 40. By so accommodating the joint, the magnetic joint wrap 42 surrounds and addresses the joint and allows for better articulation of the joint while the magnetic joint wrap 42 is wrapped about it.

As shown in Figure 2, attachment elements provide means by which the magnetic joint wrap 42 may be attached to the joint. Particularly, in one embodiment, hook and loop fasteners such as that marketed under the name of VELCRO® may be used to provide detachable attachment means by which the magnetic joint wrap 42 may be attached to the joint and its adjacent tissue or anatomical structures.

As shown in Figure 2, a first attachment element 50 has a corresponding and oppositely opposed attachment element 52 on a same side of the magnetic joint wrap 42. Both attachment elements 50, 52 take the form of strips or projections that serve to adjustably and attachably engage a second attachment element 54 at the opposite side of the magnetic joint wrap. The exterior of the second attachment element 54 may be a hook portion of the hook and loop fastener while the interior or facing portions of the first attachment elements 50, 52 (portions that would face the second attachment element 54 when serving to attach the magnetic joint wrap 42), may be hook portions of a hook and loop fastener. Alternatively, snaps, buttons, or other means by which non-destructive and detachable fixation may be made between the two ends of the magnetic joint wrap 42 may be achieved may also be used to good

advantage.

Alternative embodiments of the magnetic joint wrap 42 of the present invention are shown in Figures 3-5 whereby specific joints may be accommodated by specific tailoring of the magnetic joint wrap 42 to the joint and its surrounding tissue.

5 In Figure 3, a magnetic joint wrap 60 for the left shoulder is shown. The aperture for the left shoulder joint wrap 60 is indicated by a reference number 62. The shoulder aperture 62 serves to provide means by which the shoulder may better engage the magnetic shoulder wrap 60. As can be seen in Figure 3, distributed attachment means 64 are shown by which the magnetic shoulder wrap 60 may be
10 attached both to the person's upper torso and the arm associated with the shoulder.

Projecting loop means 70, 74 such as those used in the magnetic joint wrap 42 as shown in Figure 2 can likewise be used in the embodiments shown in Figure 3. While the shoulder fits within the aperture 62, the upper torso is wrapped by a first portion 66 of the magnetic joint wrap 60 while the left arm is wrapped by a second
15 portion 68. Torso attachment means 70, 72 may include VELCRO® or hook and loop fasteners so that the facing portions of the torso attachment elements 70, 72 when facing each other wrap around the upper left torso of a person. The torso attachment means 70, 72 serve to adjustably and detachably engage one another to affix the magnetic shoulder joint wrap 60 of the present invention to the upper left torso of the
20 person. In order to better attach the remaining arm portion 68 of the left shoulder magnetic joint wrap of Figure 3 to the person, similar arm attachment means 74, 76 are used to attach the second arm portion 68 of the magnetic shoulder joint wrap 60 to the upper left arm or bicep of the person. Similar means may be used for the arm attachment elements 74, 76 as for the torso attachment elements 70, 72. In this way,
25 adjustable and attachable means by which the left shoulder magnetic joint wrap 60 of Figure 3 may be attached to the left shoulder of a person may be achieved. Such attachment is shown in Figure 1 and is generally indicated at 30.

The embodiment of the present invention accommodating the right shoulder of a person may be achieved by generally creating a mirror image of the left shoulder
30 magnetic joint wrap 60 as shown in Figure 3.

In Figure 4, an elbow or knee wrap 80 is shown. The aperture 82 therein

serves to accommodate either a knee for larger versions of the embodiment shown in Figure 4 or an elbow for smaller versions of the embodiment shown in Figure 4. Certain accommodations may also be made for the skeleto-muscular structure adjacent both the knee and the elbow for the corresponding embodiments. However,
5 generally, it appears that the configuration shown in Figure 4 is applicable to both knees and elbows.

The attachment elements 84, 86, 88, 90 that serve to hold the knee/elbow wrap 80 to the associated limb are generally the same as shown in Figures 2 and 3 with VELCRO® hook and loop fasteners forming one embodiment that is
10 complemented by other means of attachment such as snaps, buttons, or other adjustably attachable fabric fixation means.

As shown in Figure 5, a wrist or hip wrap 100 (along the lines of that shown in Figure 2) has dual apertures 102, 104 to accommodate oppositely opposed joint protuberances. Attachment elements 106, 108 serve to detachably attach to the
15 corresponding attachment element 110 at the opposite end of the magnetic joint wrap 100.

All the magnetic joint wraps shown in Figures 1-5, as well as the eye and face masks of Figure 6-8, all incorporate strong static magnets and/or magnetic compounds in order to provide strong magnetic fields. By means of such magnetic fields,
20 effective magnetotherapy may be applied to the adjacent tissues. Recently, magnets having very strong magnetic properties have been recently developed. Particularly, neodymium iron boron (NdFeB or Nd-Fe-B) magnets provide very strong magnetic fields in the form of a permanent magnet. Such magnetism is well preserved and maintained at room temperatures that are well below the Curie temperatures for these
25 magnets. Additionally, strong magnets such as ALNICO or ceramic magnets may be used so long as the flexibly elastic properties of the magnetic wrap are maintained. However, NdFeB magnets are advantageously used in the present situation as they provide the strongest magnetic fields for magnetotherapeutic purposes.

As indicated by trade materials published by Stanford Materials of San Mateo,
30 California, the maximum energy product (BH max) of NdFeB magnets can easily reach 30 MGOe (megaGauss Oersted) and even go up to 48 MGOe for some magnets. The use of such magnetic materials for use in conjunction with static magnetism

magnetotherapy is apparently new to the art as are the joint wraps incorporating such magnetic joint wraps of the present invention have incorporate such magnetotherapeutic properties.

Alternatively, magnetic ferrite can be used to good effect instead of NdFeB magnets.

In order to enhance such magnetotherapeutic properties, especially for iron or electrolytic fluids passing in proximity to such strong magnetic fields, Figures 9-13 show a variety of magnet configurations to provide for alternating magnetic polarity as travel is made along the magnetic sheets forming the magnetic joint wraps 42, etc. of the present invention. By arranging for alternate polarity, changing magnetic fields are encountered by charged molecules or atoms passing sufficiently proximate to the magnetic joint wrap so as to be subject to its magnetic fields. It is known that such changing magnetic fields induce currents and will also serve to exert both repelling and attractive forces upon such charged molecules or atoms.

With the additional articulation of the adjacent joints associated with the joint wraps of the present invention, additional changes or alteration to the magnetic field configuration imposed upon the adjacent tissues should be experienced to give rise to even more alternating or changing polarity of the magnetic fields involved. For example, when a person walks with one of the magnetic joint wraps of the present invention (such as that shown in Figure 4), the articulation of the knee wrapped with the magnetic joint wrap serves to change the configuration of the associated joint wrap to give rise to additional changes in the magnetic fields provided by the magnetic joint wrap. It could therefore be seen that use of the magnetic wrap of the present invention in athletic or casual activities may serve to enhance the magnetotherapeutic effects thereof.

In Figures 6-8, eye and face masks are shown which may incorporate strong NdFeB magnets or other flexibly elastic and strongly magnetic components. Figure 6 shows an eye mask 120 having an opaque exterior portion 122 with a nose notch 124. An elastic band or the like 126 serves to adjustably hold the eye mask 120 to a person's face as the elastic band 126 may pass through apertures or holes 128 present at the sides 130 of the eye mask. As shown in Figure 6, a magnetic indicator 132 indicates a magnetic configuration as incorporated by the eye mask 120 and as

reflected by the pattern shown in Figures 11 and 12. The magnetic indicator 132 may have a protective case 134 having a notch 136 by which the indicator 132 is more easily pivoted away from the protective case.

As shown in Figure 7, the interior portion of the eye mask 120 has the opaque exterior portion 122 providing an opaque interior portion 122 so that light may not pass through the opaque exterior portion 122. This keeps the confines of the eye mask 120 generally dark when it is affixed over a person's eyes. In order to space the opaque portion 122 away from the person's face, a foam rubber or other comfortable engaging surface 138 circumscribes the perimeter of the opaque portion 122 so as to space apart the opaque portion 122 away from the person's face. This generally keeps the opaque portion from interfering with batting eyelashes or the like which can be a distraction to the person wearing the eye mask 120. As shown in Figure 7, the eye mask ends 130 may have wider foam rubber portions that accommodate the sides of a person's face near the eyes. The foam rubber serves as a light-tight gasket that comfortably engages the portions of a person's face surrounding the eyes so as to prevent the transmission of light into the eye mask and onto the person's eyes. A bead or the like 140 may serve to adjustably restrict the length of the elastic band 126 so that it may be adjustably conformed to hold the eye mask 120 to a person's face. The bead 140 may form a secondary loop 142 that serves to eliminate the slack that would otherwise be present in the elastic band 126.

In Figure 8, a face mask 150 incorporating the superstrong and alternating polarity magnetic structures of the present invention is shown. Magnetic indicators 132 serve to show the checkerboard 152 or series of concentric circles 154 of alternating magnets as is respectively shown in Figures 9 and 10 (for a checkerboard configuration 152) and Figure 13 (for the series of concentric circle configuration 154). The face mask 150 may also use elastic bands 156 with loops for taking up slack 158 created by the adjustable use of adjustment beads 160. The adjustable elastic bands 156 may pass through apertures 162 present at the sides 164 of the face mask 150.

Apertures in the face mask 150 may be present to accommodate the eyes 170, the nose 172, and the mouth 174. By providing a strongly magnetic face mask 150 as

shown in Figure 8 (constructed along the lines of the magnetic joint wraps described previously), magnetotherapeutic treatment may be effectively applied to a person's face for significant periods of time, particularly those during periods of sleep.

In order to achieve the flexibly stretchable and soft-to-the-touch material preferably used in the present invention, NEOPRENE® may be prepared with a magnetic ferrite filler, or, in the alternative, a neodymium-based magnetic filler. Caution should be used with neodymium-based substances as they have toxic properties. The amounts set forth below are percentage by weight. However, these percentages may be crudely converted into parts per hundred rubber (PHR) by the using the percentage weight of NEOPRENE® to define one hundred parts per hundred.

Using a two-roll rubber mill as is known in the art, a slower roller is coated with NEOPRENE® while the entire roller structure is maintained in a cool condition as by a ten-ton chiller. The rollers may be approximately twenty inches (20") in diameter and sixty inches (60") in length. Once the NEOPRENE® has fully coated the slower roller, the magnetic ferrite or other strongly magnetic material may be fed into the highly viscous NEOPRENE®. The magnetic ferrite and other fillers are mixed into the highly viscous NEOPRENE® during the rolling process as it is fed into the nip, or bank, formed between the upper and faster spinning roller and the lower and slower turning roller. In addition to the magnetic ferrite or other strongly magnetic material, stearic acid, a complex fatty acid such as that known currently in the trade as INT-21G as manufactured by Axel Plastics Research Laboratories, of Woodside, New York, and zinc oxide curatives may be mixed in. The percentages by weight of these materials are as follows:

<u>Substances</u>	<u>Percentage by weight</u>	<u>PHR</u>
Du Pont NEOPRENE® WRT	26.9%	100
Magnetic Ferrite	70.0%	260.22
Stearic Acid	0.20%	0.74
INT-21G	1.5%	5.58
Zinc oxide curatives	1.4%	5.20

In mixing the filler into the rolling NEOPRENE®, it is important to ensure that the INT-21G is not mixed in prematurely as it has a tendency to increase the viscosity of the rolling NEOPRENE® beyond that which is effective for working.

Consequently, it is better to work in the magnetic ferrite first before adding too much of the INT-21G. One means by which this can be effected is by loading the feeder with the magnetic ferrite and then on top of the magnetic ferrite, adding the INT-21G, possibly with the stearic acid and zinc oxide curatives.

The NEOPRENE® is then worked into a sufficiently mixed condition. The rollers are then stopped and "pigs" are pulled off in strips and rolled up into a chilled calendar for pre-forming prior to pressing. Vulcanization then occurs during the pressing process which occurs at approximately two hundred (200) tons pressure and 350°F. It should be noted that the Du Pont NEOPRENE® WRT contains antioxidantizing agents and the like to prevent oxidation of the magnetic ferrite. Additionally, the stearic acid helps to delay vulcanization so that it does not occur until intentionally induced during the pressing process. The zinc oxide curatives also help to cure the final product.

Once the pressing step has occurred, the resulting magnetizable and flexibly stretchable elastic sheet is then subject to lamination where glue is applied and then a stretchable fabric is applied to the stretchable elastic sheet to make it soft to the touch. The elasticity or stretchability of the applied fabric should be sufficient to accommodate the elastic and/or stretchable limits reasonably attained by the flexible and elastic magnetizable sheet.

In a less preferred but alternative embodiment, the following components were used in units of parts per hundred rubber (PHR).

<u>Component</u>	<u>PHR</u>
Royalene 552	55.00-45.00
Nordel 2744	
Vistanex L-140	45.00-55.00
CAPOW L-38H	3.75
CAPOW L-12H	1.25
SINO AM. P-4	1,250.00

25	<u>Component</u>	<u>PHR</u>
	Ethanox 330	1.50
	AC 617A	1.50
	"Zic Stick 85"	3.00
	Stearic Acid	0.75
5	Altax (MBTS)	0.30
	Methyl Tuads (TMTD)	0.50
	Sulfur	0.50
	PVI (Santogard/Vangard)	Optional

The Royalene 552 is the Uniroyal brand of EPDM and may possibly be
 substituted by a Royalene 7200. These and other plastics are commonly available in
 pellet form. The Nordel 2744 may also act as a substitute for the Royalene 552 and
 is Du Pont's brand of EPDM. The Vistanex L-140 is a polyisobutylene compound
 available through Exxon. CAPOW L-38H and L-12H are organometallic couplers
 that are optionally used, but are preferred. SINO AM. P-4 is a lean neodymium
 magnetic filler used to confer magnetism properties to the resulting magnetic flexibly
 elastic magnetic sheet. Ethanox 330 is an antioxidant available through Ethyl
 Corporation. AC 617A is a polyethylene wax available through Allied-Signal. "Zic
 Stick 85" is a zinc oxide curative medium. The stearic acid is preferably of triple-
 pressed grade. The Altax, Methyl Tuads, and Sulfur are best added in a predispersed
 form and operate with the "Zic Stick 85," stearic acid, Altax (MBTS), Methyl Tuads
 (TMTD), and PVI (Santogard/Vangard) in order to effect a curing compound or
 mixture for the EPDM (ethylene/propylene/diene terpolymer).

One marketing channel for the Vistanex L-140 is R.T. Vanderbilt of Norwalk,
 Connecticut. The organometallic coupling agents (neoalkoxytitanates) are
 manufactured and sold by Kenrick Petrochemicals, Bayonne, New Jersey.

In order to mix this alternative formulation, a mill is used. When mill mixing,
 warm mill rolls should be used initially. The Vistanex is initially banded about one
 roller using a tight mill gap. The EPDM is then added and blended with the
 Vistanex. Coupling agents are added and blended with the banded materials. Slow

addition of the P-4 neodymium compound is made with cool water turned on to cool the mill rollers. The mill gap is gradually opened as the P-4 incorporates into the binder thus increasing the batch volume. The polyethylene wax (AC 617A) can be added with the P-4 at the beginning of the addition process. The same is similarly
5 true for the stearic acid. The rest of the curing mixture is then added at the end of the P-4 addition step. The components are blended and distributed throughout the batch as quickly as possible. The mill is slabbed off and the sheets are cooled on a flat surface as soon as possible. The mill gap is then reset with warm rollers and resheeted with Vistanex to begin the process again. An additional variation of the
10 process includes reducing the P-4 and/or increasing the Vistanex ratio.

While the present invention has been described with regards to particular embodiments, it is recognized that additional variations of the present invention may be devised without departing from the inventive concept.

INDUSTRIAL APPLICABILITY

15 It is an object of the present invention to provide a magnetotherapeutic wrap for joints.

It is another object of the present invention to provide highly magnetic magnetotherapy for such joints.

It is an additional object of the present invention to provide strong
20 magnetotherapeutic joint wraps for joints with such joint wraps having alternating magnetic polarity.

It is yet another object of the present invention to provide face and eye masks incorporating strong magnets so as to apply magnetotherapeutic treatment upon adjacent tissues.

25 These and other objects, advantages, and the industrial utility of the present invention will be apparent from a review of the accompanying specification and drawings.

CLAIMS

What is claimed is:

1. A magnetotherapeutic wrap for joints, comprising:
 - a sheet of magnetic material defining an aperture;
 - said aperture accommodating a joint;
 - a first attachment element coupled to a first side of said sheet; and
 - a second attachment element coupled to a second side of said sheet,
 said second attachment element detachably attaching to said first attachment element to couple said sheet to a limb or member adjacent said joint;
- whereby

said joint may be accommodated by said aperture with said sheet wrapped about said joint adjacent said joint to supply attachably detachable magnetotherapy to said joint, said aperture allowing better articulation of said joint when said sheet is wrapped about said joint.

2. The magnetotherapeutic wrap for joints of Claim 1, wherein said sheet of magnetic material further comprises:

a flexible and elastic sheet of strongly magnetic material, said sheet conforming to said joint when wrapped about said joint.

3. The magnetotherapeutic wrap for joints of Claim 2, wherein said flexible and elastic sheet of strongly magnetic material further comprises strongly magnetic materials to provide a strong magnetic field adjacent said joint, said strongly magnetic materials selected from the group consisting of:
 - neodymium-based magnetic materials and magnetic ferrite.

4. The magnetotherapeutic wrap for joints of Claim 2, wherein said flexible and elastic sheet of strongly magnetic material comprises approximately:

<u>Substance</u>	<u>Percentage by weight</u>	<u>PHR</u>
Du Pont NEOPRENE® WRT	26.9%	100

	<u>Substance</u>	<u>Percentage by weight</u>	<u>PHR</u>
4			
6	Magnetic Ferrite	70.0%	260.22
	Stearic Acid	0.20%	0.74
8	INT-21G	1.5%	5.58
	Zinc oxide curatives	1.4%	5.20

5. The magnetotherapeutic wrap for joints of Claim 1, wherein said joint
 2 accommodated by said aperture is selected from the group consisting of:
 ankles, knees, hips, wrists, elbows, shoulders, and necks.

6. The magnetotherapeutic wrap for joints of Claim 1, wherein said sheet
 2 of magnetic material further comprises:
 a sheet of magnetic material having alternating magnetic polarity.

7. The magnetotherapeutic wrap for joints of Claim 6, wherein said sheet
 2 of magnetic material having alternating magnetic polarity comprises planar
 alternating magnetic means whereby travel in any direction along said sheet of
 4 magnetic material provides alternating magnetic polarity.

8. The magnetotherapeutic wrap for joints of Claim 7, wherein alternating
 2 magnetic polarity of said sheet of alternating magnetic polarity material is
 selected from the group consisting of:
 4 alternating magnetic triangles, alternating magnetic squares, and
 series of alternating concentric circles.

9. A magnetotherapeutic wrap for joints, comprising:
 2 a flexible and elastic sheet of strongly magnetic material having
 alternating magnetic polarity incorporating superstrong magnetic material to
 4 provide a strong magnetic field;
 said sheet defining an aperture accommodating a joint;
 6 said sheet conforming to said joint when wrapped about said joint;

a first attachment element coupled to a first side of said sheet; and
 a second attachment element coupled to a second side of said sheet,
 said second attachment element detachably attaching to said first attachment
 element to couple said sheet to a limb or member adjacent said joint;
 whereby

said joint may be accommodated by said aperture with said sheet
 wrapped about said joint adjacent said joint to supply attachably detachable
 magnetotherapy to said joint, said aperture allowing better articulation of
 said joint when said sheet is wrapped about said joint.

10. The magnetotherapeutic wrap for joints of Claim 9, wherein said
 flexible and elastic sheet of strongly magnetic material comprises
 approximately:

<u>Substance</u>	<u>Percentage by weight</u>	<u>PHR</u>
Du Pont NEOPRENE® WRT	26.9%	100
Magnetic Ferrite	70.0%	260.22
Stearic Acid	0.20%	0.74
INT-21G	1.5%	5.58
Zinc oxide curatives	1.4%	5.20

11. The magnetotherapeutic wrap for joints of Claim 9, wherein said joint
 accommodated by said aperture is selected from the group consisting of:
 ankles, knees, hips, wrists, elbows, shoulders, and necks.

12. The magnetotherapeutic wrap for joints of Claim 9, wherein said
 flexible and elastic sheet of strongly magnetic material further comprises
 strongly magnetic materials to provide a strong magnetic field adjacent said
 joint, said strongly magnetic materials selected from the group consisting of:
 neodymium-based magnetic materials and magnetic ferrite.

13. The magnetotherapeutic wrap for joints of Claim 9, wherein said sheet

2 of magnetic material having alternating magnetic polarity comprises planar
alternating magnetic means whereby travel in any direction along said sheet of
4 magnetic material provides alternating magnetic polarity.

14. The magnetotherapeutic wrap for joints of Claim 13, wherein
2 alternating magnetic polarity of said sheet of alternating magnetic polarity
material is selected from the group consisting of:

4 alternating magnetic triangles, alternating magnetic squares, and
series of alternating concentric circles.

15. A strongly magnetic magnetotherapeutic mask for improving blood
2 circulation adjacent a person's face, comprising:

4 an opaque eye mask covering the eyes of the person's face and
preventing light from illuminating the person's eyes;

6 an opaque perimeter cushion circumscribing a perimeter of said eye
mask, said perimeter cushion holding said eye mask slightly away from the
person's face for the person's greater comfort, said perimeter cushion
8 providing a light-tight seal between said eye mask and the person's face so
that the person's eyes are held in darkness by the magnetic mask;

10 superstrong magnetic planar alternating magnetic means for
providing changes in magnetic polarity, said alternating magnetic means
coupled to said eye mask, travel in any direction in a plane of said
12 alternating magnetic means providing alternating magnetic polarity; and

14 an adjustable elastic band for adjustably attaching said eye mask to
the face; whereby

16 the person donning the magnetic mask may darken the face and eyes
and subject them to spatially alternating magnetic polarity consequently
18 stimulating ferromagnetic ion-containing blood as it passes through
changing magnetic fields.

16. The strongly magnetic magnetotherapeutic mask for improving blood
2 circulation adjacent a person's face of Claim 15, wherein said superstrong

magnetic planar alternating magnetic means for providing changes in magnetic polarity is selected from the group consisting of:

neodymium-based magnetic materials and magnetic ferrite.

17. The strongly magnetic magnetotherapeutic mask for improving blood circulation adjacent a person's face of Claim 15, wherein said planar alternating magnetic means is selected from the group consisting of:

alternating magnetic triangles, alternating magnetic squares, and series of alternating concentric circles.

18. A strongly magnetic magnetotherapeutic mask for improving blood circulation adjacent a person's face, comprising:

a face mask defining openings or apertures for the person's eyes, nose, and mouth;

superstrong magnetic planar alternating magnetic means for providing changes in magnetic polarity, said alternating magnetic means coupled to said face mask, travel in any direction in a plane of said planar alternating magnetic means providing alternating magnetic polarity; and

an adjustable elastic band for adjustably attaching said face mask to the face; whereby

the person donning the magnetic mask may cover the face and subject it to spatially alternating magnetic polarity consequently stimulating ferromagnetic ion-containing blood as it passes through changing magnetic fields.

19. The strongly magnetic magnetotherapeutic mask for improving blood circulation adjacent a person's face of Claim 18, wherein said planar alternating magnetic means is selected from the group consisting of:

alternating magnetic triangles, alternating magnetic squares, and series of alternating concentric circles.

20. The strongly magnetic magnetotherapeutic mask for improving blood

- 2 circulation adjacent a person's face of Claim 18, wherein said superstrong
magnetic planar alternating magnetic means for providing changes in magnetic
4 polarity is selected from the group consisting of:
 neodymium-based magnetic materials and magnetic ferrite.

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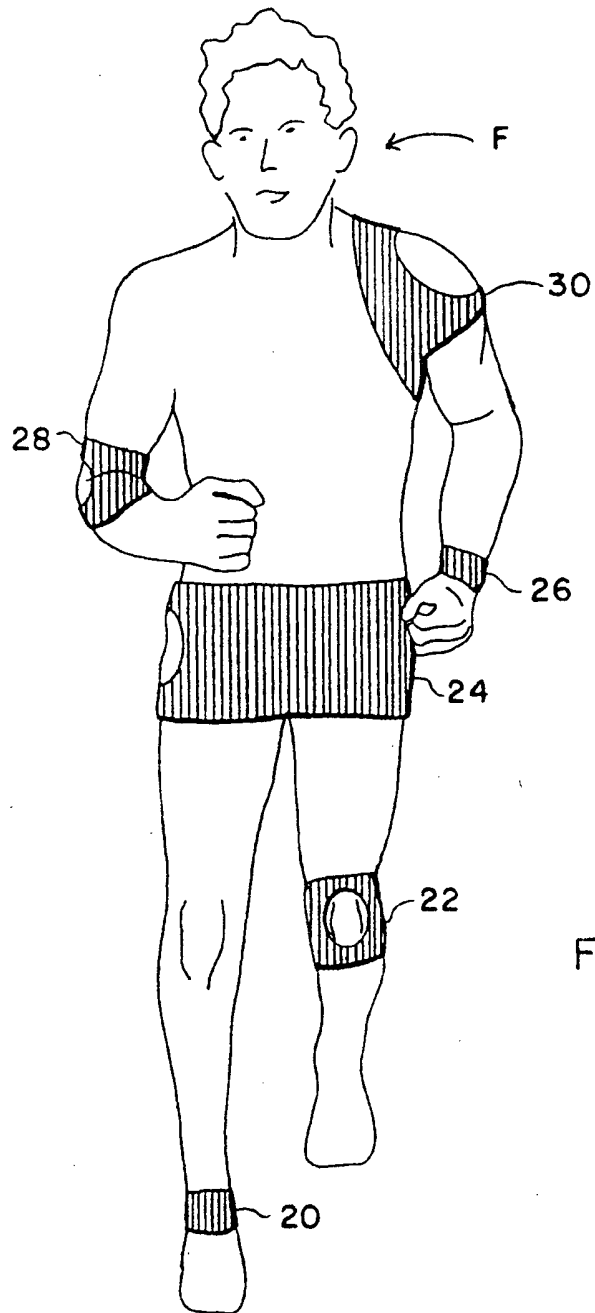


FIG. 1

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FIG. 2

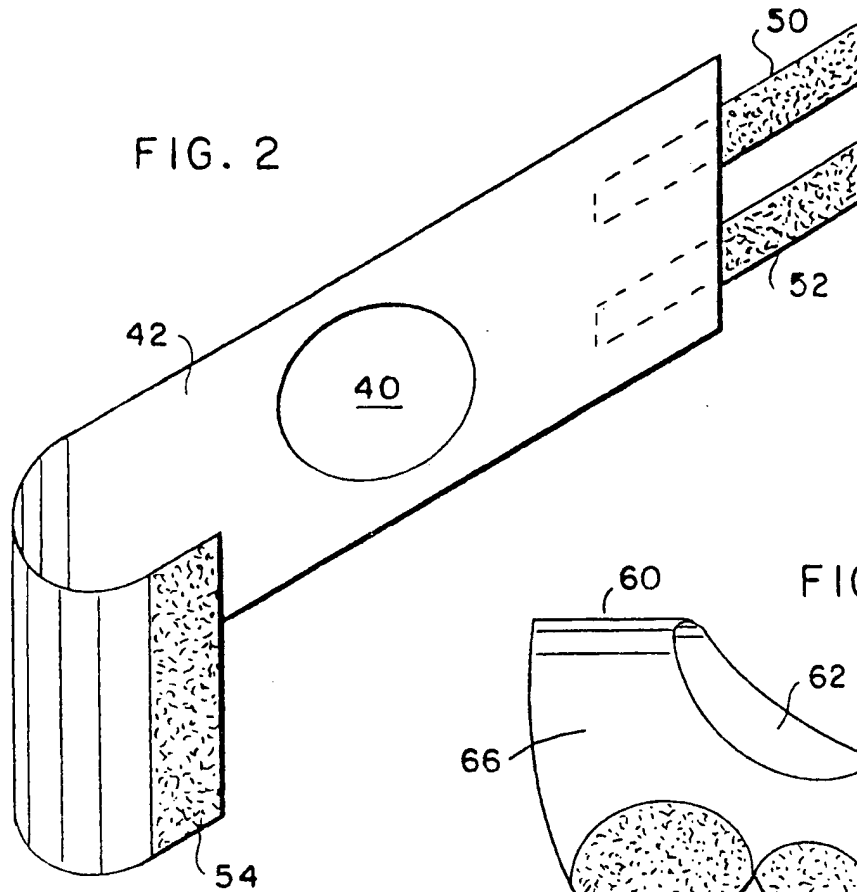


FIG. 3

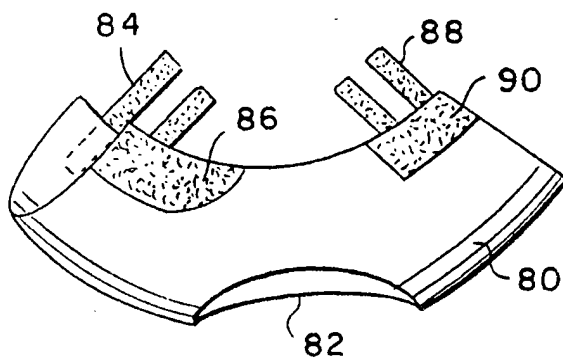
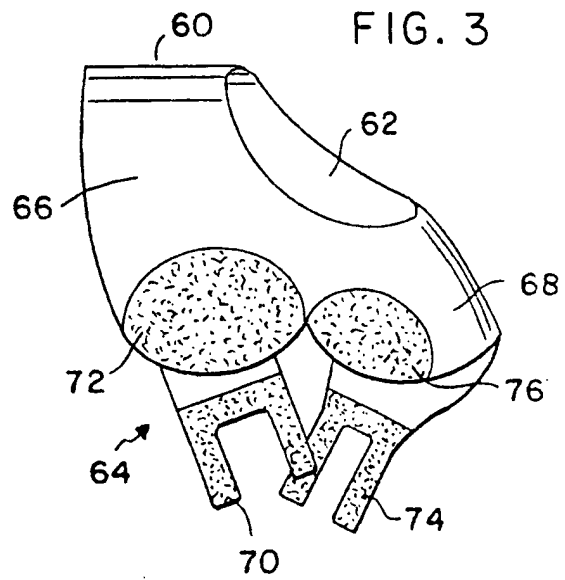


FIG. 4

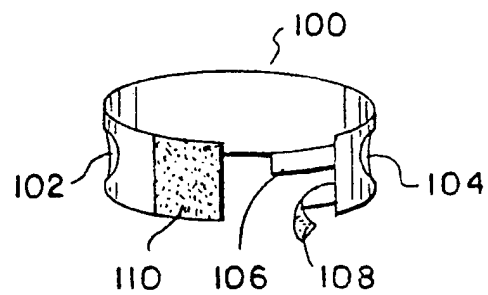


FIG. 5

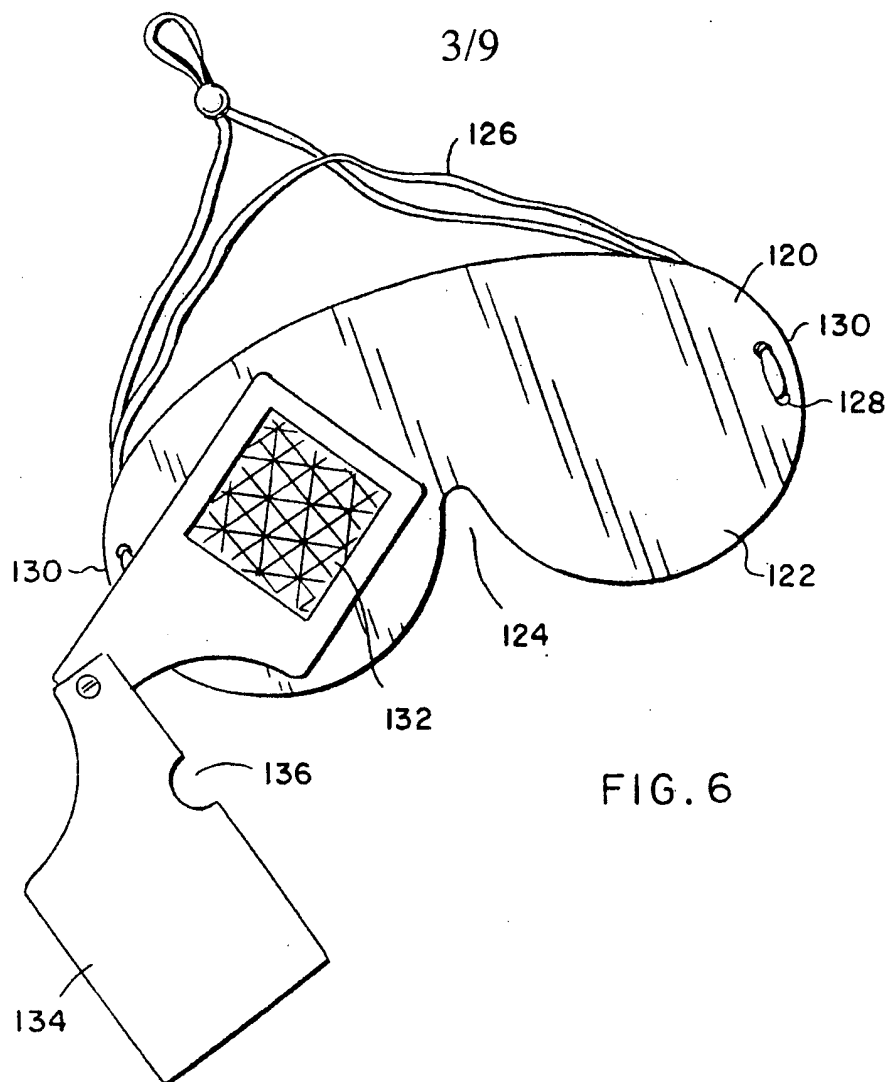


FIG. 6

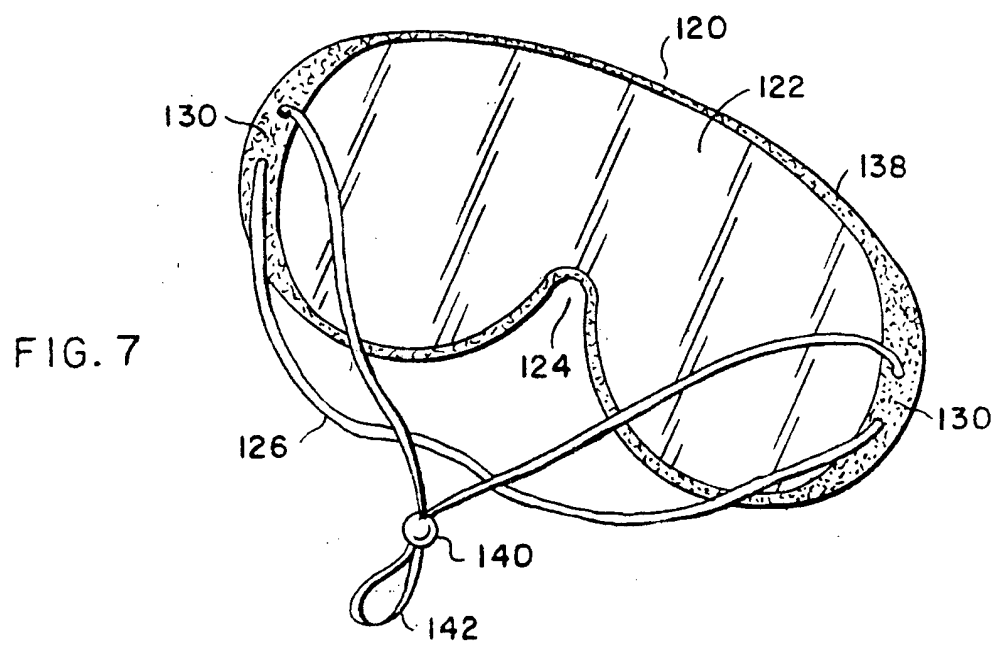


FIG. 7

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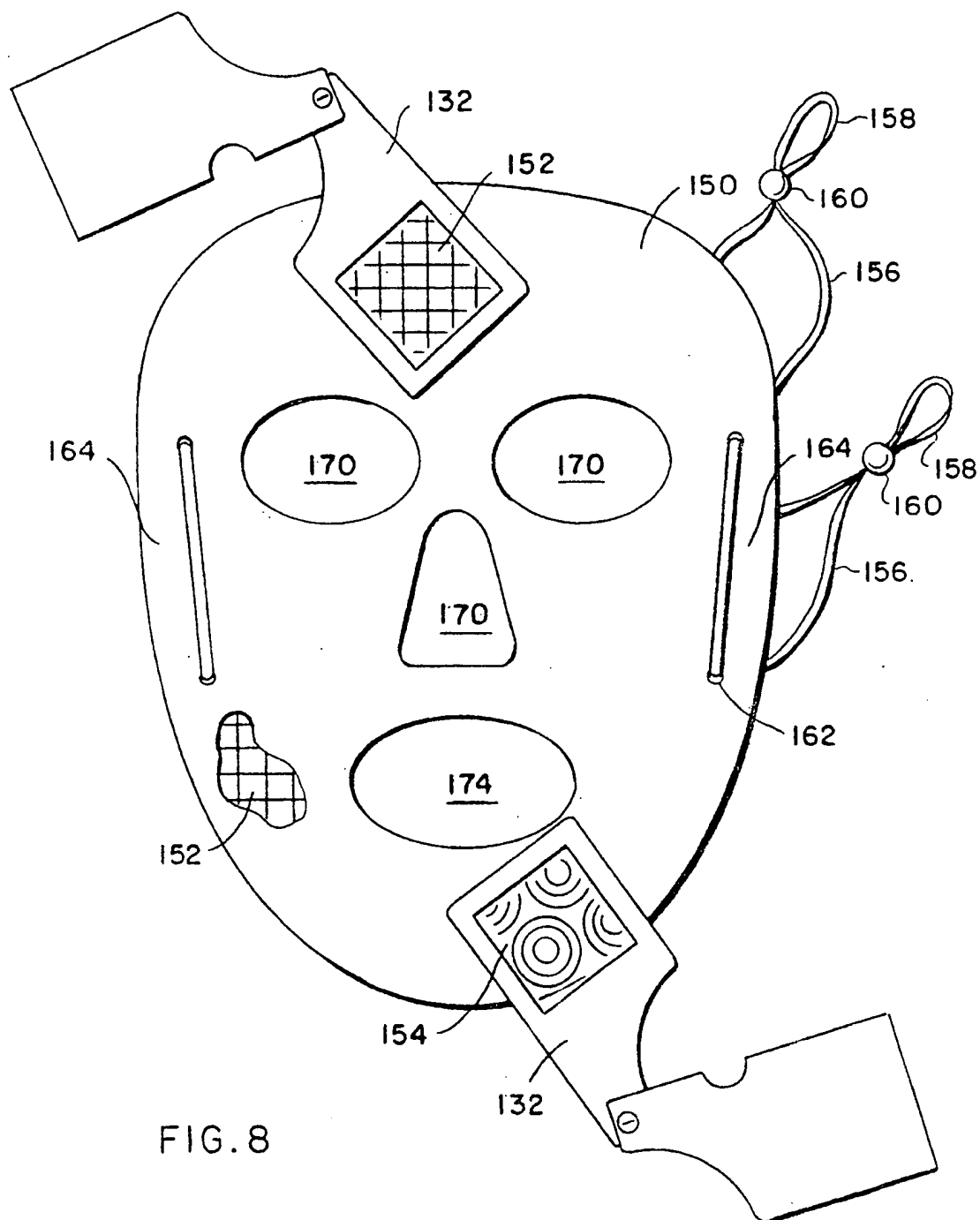


FIG. 8

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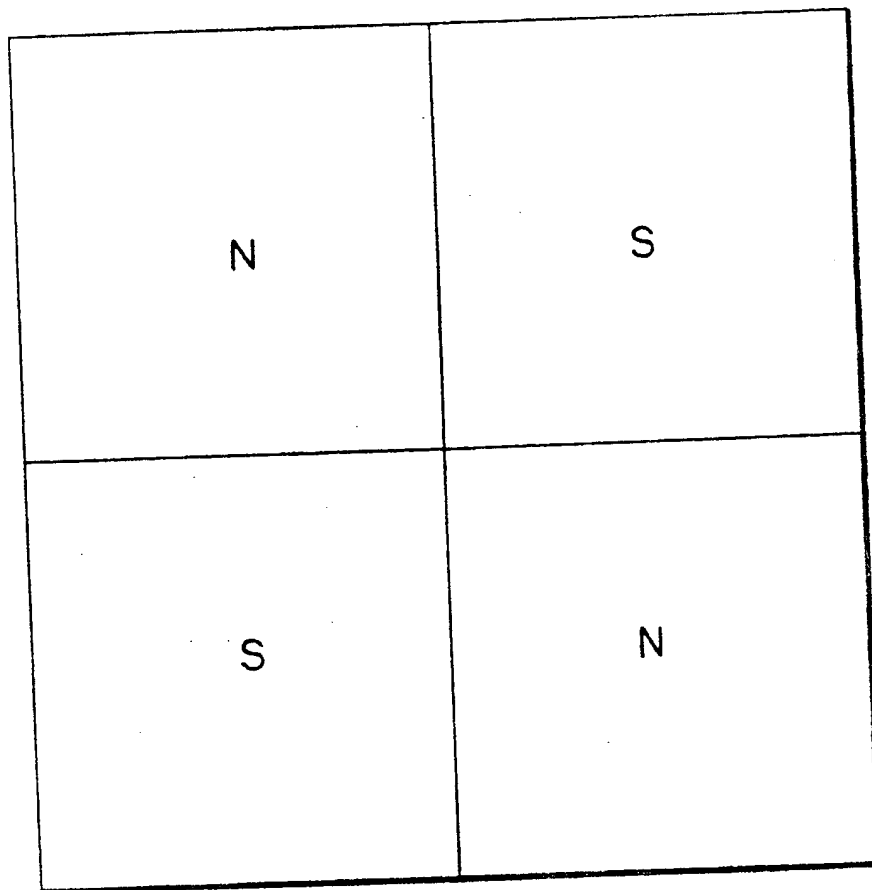


FIG. 9

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N	S	N	S	N
S	N	S	N	S
N	S	N	S	N
S	N	S	N	S
N	S	N	S	N

FIG. 10

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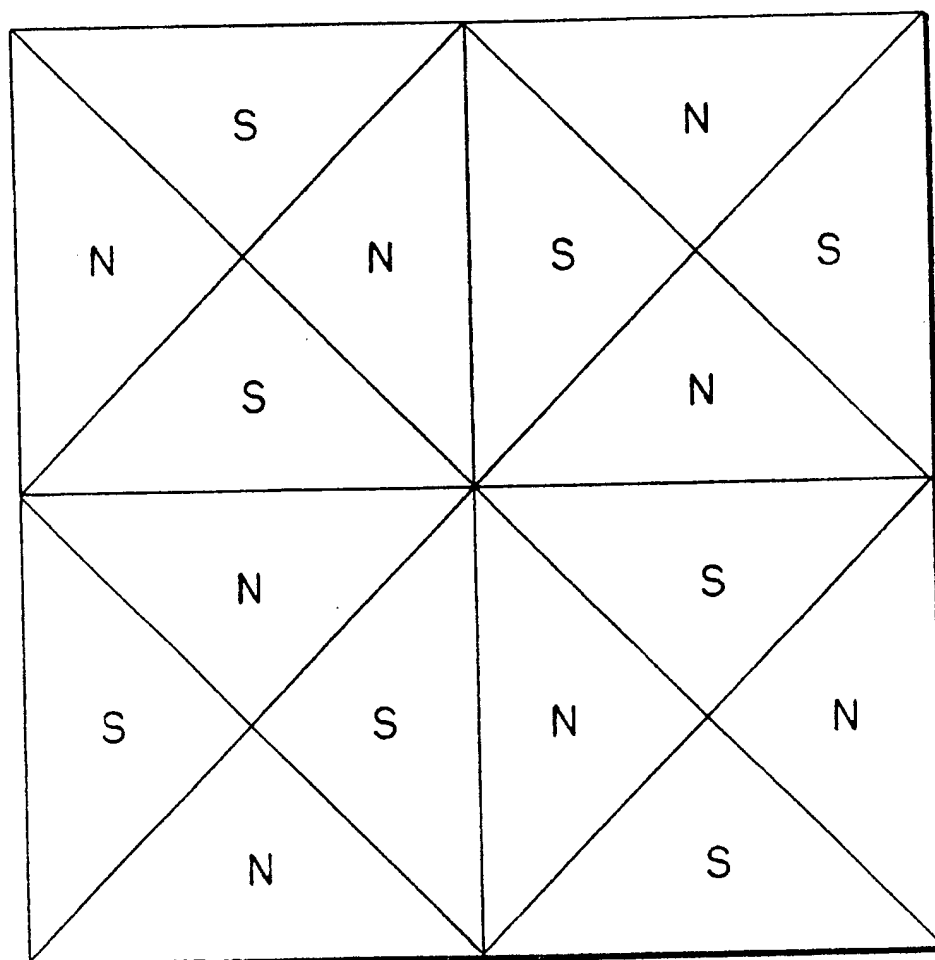


FIG. II

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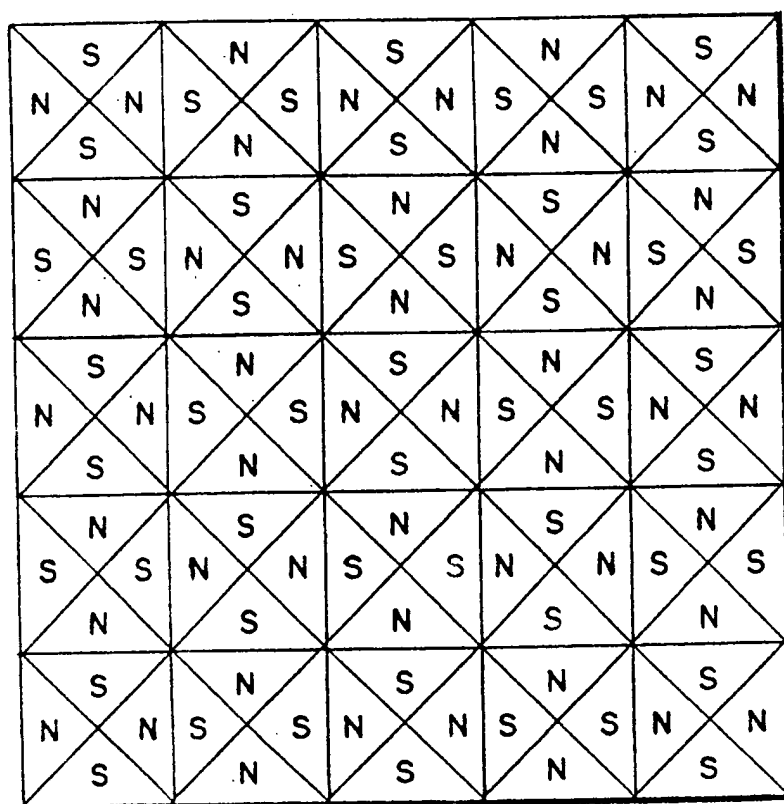


FIG. 12

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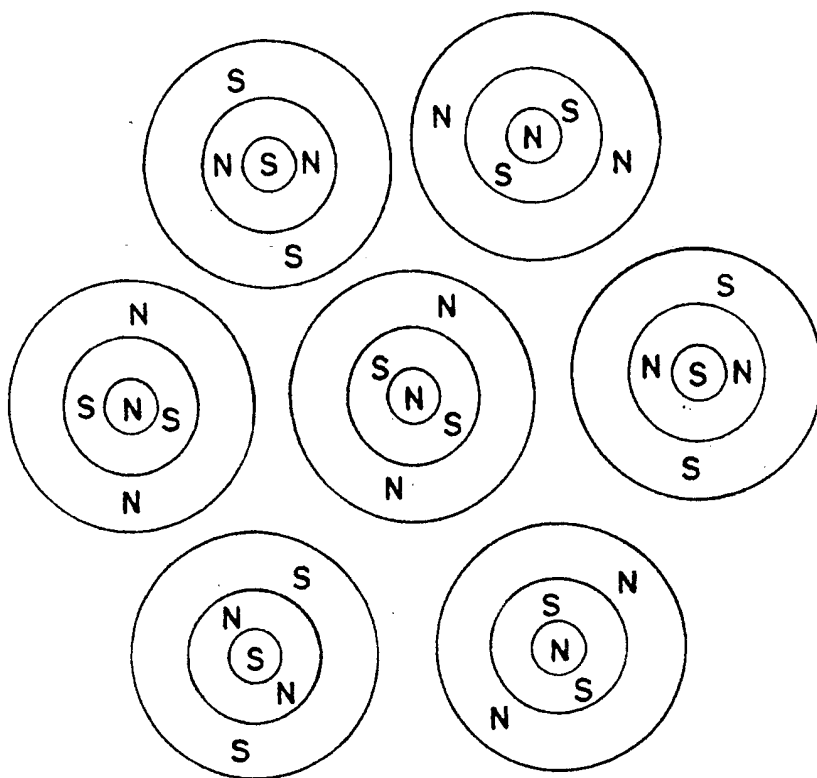


FIG. 13

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/16546

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61N 1/00

US CL :600/9

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 600/9, 10, 11, 12, 13

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,707,333 A (BAKST) 13 January 1998.	1-20
A	WO 94/13357 A (ELECTROMAGNETIC BRACING SYSTEMS) 23 June 1994.	1-17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

18 SEPTEMBER 1998

Date of mailing of the international search report

29 JAN 1999

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